

Work Order ID 130091

Monday, February 23, 2015 10:52:12 AM

130091

U/R

Page 1

Item ID: D412-664-403

Accept

N9000040100

Setup Start

NS1

Revision ID:

Stop

NS2

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 2/23/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 2/23/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

MLJ

Date: 15-02-23

Tooling:

Date:

Run Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

Draw Nbr

Revision Nbr

D412-664-443

A U/R

OK 15/2/23

MLJ

15-06-22

100

Document Control

0.00

100

DOCUMENT CONTROL

DC

Memo

0.00

Doc.Control -USB or Paperwork

Photocopy bluefile & type labels per PPPD412-664-403 CHG001

DAS
02
9-89

JUN 22 2015

110

0.00

110

BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D412-664-443 using CNC bender program _____ and Folio FT _____

JT

15-06-04

USE (4) DT9824 SHIM BLOC TO CHECK STRAIGHTNESS

127

QC15- Crosstube Dimensional Check

0.00

127

QC

Memo

0.00

Quality Control

MARK CUT LINES

①

15-06-04

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐															
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐															
Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐															
Large Fab ☐	Composite ☐	Supplier ☐																

Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Work Order ID 130091***130091***

Page 2

Item ID: D412-664-403

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 2/23/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 2/23/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Run Start ***NR1***

Approvals: Process Plan:

Date:

Tooling:

Date:

Stop ***NR2***

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

128

0.00

128

Crosstubes

Crosstubes

Memo

0.00

CUT TUBE AT HEIGHT ON FAIR SHEET

VERF HEIGHT 24.375 BY QC 15 LEVEL INSPECTORVERF TWIST 0.002 BY QC 15 LEVEL INSPECTOR

DAS

38

9-89

38

9-89

JUN 11 4 2015

130

0.00

130

Crosstubes

Crosstubes

Crosstubes

Memo

0.00

1- Drill Tube as per Dwg D412-664-443 Using DT _____ Drill Jigs,
Set-up drill table as per QSI 010

2-Deburr

3- Engrave Part # and Batch # as per Dwg D412-664-443

4-Remove all marks from tube within limits of D412-664-43 DWG.

15-06-05
15/06/05

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Crosstube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐
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Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
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Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Work Order ID 130091***130091***

Page 3

Item ID: D412-664-403

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

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Start Date: 2/23/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 2/23/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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140 QC6- Inspect dimensions to drawing

0.00

140

QC

Memo

0.00

Quality Control

174 Outsource process - NDT per QSI038 4.1

0.00

174

Outsource2

Memo

0.00

Outsource process - NDT

ISSUE P/O TO ACCUREN: 28743

JUN 10 2015

176 Receive & Inspect for Damage & Mat'l Certs

0.00

176

Packaging

Memo

0.00

Packaging

1X SP 15-06-10

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐															
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐															
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Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence
		☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge
		☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other

Work Order ID 130091

Monday, February 23, 2015 10:52:12 AM

130091

Page 4

Item ID: D412-664-403

Accept

N900040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 2/23/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 2/23/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start *NR1*

QC:

Date:

SPC (Y/N):

Date:

Stop *NR2*

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

178

QC5- Inspect part completeness to step on W/O

0.00

178

QC

Memo

0.00

Quality Control

JUN 16 2015

180

0.00

180

SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside & outside crosstube as per QSI 005 4.2

BATCH: 132384

12-06-12

2- MASK UNDERSIDE OF CROSSTUBE AS SHOWN ON DWG BEFORE PAINTING

3 -Paint Outside of Tube as per Dart QSI 005 4.2

BATCH: 131544

15-06-16 CM

4- After painting remove masking and apply matte clear coat per QSI005 4.2

CLEAR BATCH: 131846

DAS
41 15-6-15
9-89

★
SEE OVER

DQA:

Date:

15/06/30

WORK ORDER NON-CONFORMANCE / UPDATE



QA Closed:

Date:

15/06/23

Work Order update only ☐

Work Order: <u>130091</u>	DISPOSITION Rework ☒ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS			
Part No. <u>D412-664-403</u>		Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☒
NCR No. <u>15-5128</u>		Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐
		Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐
		Large Fab ☐	Composite ☐	Supplier ☐	

Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design	15/6/9	180	1	Priming I.D. may be difficult and may peel in service	DAS 12 9-89 15/6/9	Acceptable to leave I.D. unprimed.	DAS 12 9-89 15/6/9	DAS 9 9-89 15-06-22	DAS 9 9-89 15-06-22
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport				Use Axalta treatment on outside surfaces per manufacturers instructions	DAS 12 9-89 15/6/9	USE Axalta 132055 BIN 132473 Axalta Metlok 2305 BIN 132473	CR/SCG	15-06-22	15-06-22
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☒ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge	☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Work Order ID 130091***130091***

Page 5

Monday, February 23, 2015 10:52:12 AM

Item ID: D412-664-403

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 2/23/2015 Start Qty: 1.00

1

Cust Item ID:

Required Date: 2/23/2015 Req'd Qty: 1.00

1

Customer:

Reference:

Run Start ***NR1***

Approvals: Process Plan:

Date:

Tooling:

Date:

Stop ***NR2***

QC:

Date:

SPC (Y/N):

Date:

Sequence ID/
Work Center IDOperation
DescriptionSet Up/
Run Hours

Tool ID

Tool #

Plan
CodeAccept
QtyReject
QtyReject
NumberInsp.
Stamp

190

QC14- Inspect Spray Paint

0.00

190

QC

Memo

0.00

Quality Control

**DAS
02
9-89****JUN 22 2015**

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width:100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐															
Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐															
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Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Work Order ID 130091***130091***

Page 6

Item ID: D412-664-403

Accept

N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 2/23/2015 Start Qty: 1.00

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Cust Item ID:

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Customer:

Reference:

Approvals: Process Plan:

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Tooling:

Date:

Run Start ***NR1***

QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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200

0.00

200

Crosstubes

Memo

0.00

Crosstubes

1- Install center support using scoth-weld DP460 per QSI 015, as per DWG. note 12. Install supports clamps using as per Dwg D412-644-443. Install clamp with rubber cushion as per DWG. note 13. ***ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT*** Torque clamps on support to 80-100 IN-LBS AS PER DWG.

A/R scoth-weld DP460

BATCH #:

EXP DATE:

2- **IF NOT ALREADY PRESENT ON CHAFFING SHEILD.** Apply a thin coat of proseal 890 per QSI 015 on inside concave surface of chafing shield and let cure per manufacturer's instructions. Install prosealed chafing shield onto crosstube by applying a thin coat of proseal 890 onto crosstube. Be sure to eliminate any air gaps. Install and torque clamps on chafing shield to 40-50 IN-LBS AS PER DWG.

A/R Proseal 890

Batch:

EXP DATE:

AFTER FINISH CURE TIME 24H

START CURE TIME:

FINISH CURE TIME:

PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.

CA 15-06-17

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Crosstube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐
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Root Cause	Date	Step	Qty	Description of work order update or non-conformance	Initial Chief Eng	Action Description	Sign & Date	Verification	QC Inspector
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Handling/Pre									
Material									
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Offset/Setup									
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Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Work Order ID 130091***130091***

Page 7

Item ID: D412-664-403

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N900040100Setup Start ***NS1***

Revision ID:

Stop ***NS2***

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Required Date: 2/23/2015 Req'd Qty: 1.00

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Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start ***NR1***

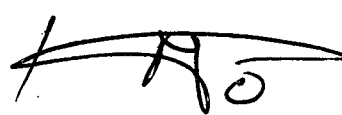
QC:

Date:

SPC (Y/N):

Date:

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210 *210* QC Quality Control	QC5- Inspect part completeness to step on W/O Memo PRIOR TO PACKAGING RE-CHECK TORQUE ON CLAMPS AFTER CURED FOR 24H.	0.00 0.00							DAS 38 9-89 JUN 19 2015
220 *220* Packaging Packaging	Pick Kit Memo	0.00 0.00							 JUN 20 2015
230 *230* QC Quality Control	QC4- 100% Inspect kits for completeness Memo	0.00 0.00							PD DAS 02 9-89 JUN 22 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
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Handling/Pre ☐									
Material ☐									
Operator ☐									
Offset/Setup ☐									
Process ☐									
Supplier ☐									
Training ☐									
Transport ☐									
Unapproved ☐									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Work Order ID 130091

130091

Page 8

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Item ID: D412-664-403

Accept

N9000040100

Setup Start *NS1*

Revision ID:

Stop *NS2*

Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 2/23/2015 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 2/23/2015 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

Run Start *NR1*

QC: Date: SPC (Y/N): Date:

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240	Packaging	0.00							
240									DAS
Packaging	Memo	0.00							02
Packaging	Identify and pack for shipping as per PPPD412-664-443								9-89
	Location: <u>50 562 4012</u>								
	PPP Rev: _____								
250	QC21- Final Inspection - Work Order Release	0.00							
250									
QC	Memo	0.00							
Quality Control									

JUN 2 2 2015

MCS JUN 2 2 2015

MCS JUN 2 2 2015

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
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Doc/Data ☐									
Equip/Tooling ☐									
Handling/Pre ☐									
Material ☐									
Operator ☐									
Offset/Setup ☐									
Process ☐									
Supplier ☐									
Training ☐									
Transport ☐									
Unapproved ☐									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence
		☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge
		☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other

Picklist Print

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Page 1

3

Work Order ID: 130091

130091

Parent Item: D412-664-403

D412-664-403

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 2/23/2015

Required Date: 2/23/2015

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP REV:A 13.10.25 NEW ISSUE DD VERF:JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

AN6-40A

Purchased

No

Each

122.0000

4

AN6-40A

Bolt

**

DAS
6
9-89

JUN 20 2015

DAS
02
9-89

DAS
9
9-89

Location

Loc Qty

Loc Code

ST286A

100

M129521

50

M131618

50

ST333

22

M130466

22

AN6-41A

Purchased

No

Each

63.0000

2

AN6-41A

Bolt

**

DAS
6
9-89

JUN 20 2015

DAS
02
9-89

DAS
9
9-89

Location

Loc Qty

Loc Code

ST286A

30

M129913

30

ST333

33

M129934

13

M131618

20

AN960JD616

AN960JD616

Purchased

No

Each

0.0000

18

AN960JD616

Washer

**

DAS
6
9-89

JUN 20 2015

DAS
02
9-89

DAS
9
9-89

m131618 x 18

NO

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
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Design									
Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence	☐ Outside Dimensions ☐ Over/Under tolerance ☐ Part Incorrect ☐ Part Lost/Missing ☐ Part Moved ☐ Positioned Wrong ☐ Power Loss/Surge ☐ Pressure/Forced ☐ Set-up ☐ Temperature/Cure ☐ Weld ☐ Wrong Stock Pulled ☐ Other
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Picklist Print

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Page 2

Work Order ID: 130091

130091

Parent Item: D412-664-403

D412-664-403

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 2/23/2015

Required Date: 2/23/2015

Start Qty: 1.00

Required Qty: 1.00

D3595-063-530

Manufactured No

Each

115.0000

2

D3595-063-530

Rubber Cushion

**

en 15-06-17

Location

Loc Qty

Loc Code

FG

5

82656

5

LG051

110

115704

99

117571

11

Each

0.0000

**

1

BL 15/06/07

D412-664-443TRN

Manufactured No

D412-664-443TRN

Crosstube Turning Detail

D4909-1

Manufactured No

Each

10.0000

1

D4909-1

Support

**

en 15-06-17

Location

Loc Qty

Loc Code

LG053

10

120359

6

121062

4

Each

12.0000

**

2

en 15-06-17

D4910-1

Manufactured No

D4910-1

Chaffing Shield

Location

Loc Qty

Loc Code

LG053

7

120253

4

121993

3

LG054

5

127443

5

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Shop Packet Print

Page 2

DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

QA Closed: _____ Date: _____

Work Order update only ☐

Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS <table style="width: 100%;"> <tr> <td>Skid-tube ☐</td> <td>Crosstube ☐</td> <td>Water Jet ☐</td> <td>Engineering ☐</td> </tr> <tr> <td>Machining ☐</td> <td>Small Fab ☐</td> <td>Prod. Eng. Coord. ☐</td> <td>Quality ☐</td> </tr> <tr> <td>Thermoforming ☐</td> <td>Finishing ☐</td> <td>Rec/Store/Packaging ☐</td> <td>Other ☐</td> </tr> <tr> <td>Large Fab ☐</td> <td>Composite ☐</td> <td>Supplier ☐</td> <td></td> </tr> </table>	Skid-tube ☐	Crosstube ☐	Water Jet ☐	Engineering ☐	Machining ☐	Small Fab ☐	Prod. Eng. Coord. ☐	Quality ☐	Thermoforming ☐	Finishing ☐	Rec/Store/Packaging ☐	Other ☐	Large Fab ☐	Composite ☐	Supplier ☐	
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Doc/Data									
Equip/Tooling									
Handling/Pre									
Material									
Operator									
Offset/Setup									
Process									
Supplier									
Training									
Transport									
Unapproved									

FAULT CATEGORY

Landing Gear ☐ Bending ☐ Centre Not Concentric ☐ Cracks ☐ Crimp/Kink/Ripple/Wave ☐ Cuffs ☐ Crushing ☐ Heat Treat ☐ Inspection Strip in Tube ☐ Marks/Chatter ☐ Turning Sequence ☐ Wave/Twist in Tube	General ☐ Bend ☐ BOM/Route ☐ Broken/Damage/Defect ☐ Burrs ☐ Contamination ☐ Countersink ☐ Cut Too Short ☐ Drawing ☐ Drill Holes ☐ Finish ☐ Fit/Function	☐ Folio/Program ☐ Grain ☐ Hardware ☐ Inspection Incomplete/Unqualified ☐ Instructions Incomplete/Unclear ☐ Misaligned/off center ☐ Mislabeled ☐ Misread ☐ Off-set ☐ Out of Calibration ☐ Out of Sequence
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Picklist Print

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Page 3

Work Order ID: 130091

130091

Parent Item: D412-664-403

D412-664-403

Parent Item Name: 412 Stainless Steel Aft Crosstubes - High

Start Date: 2/23/2015

Required Date: 2/23/2015

Start Qty: 1.00

Required Qty: 1.00

MS21042L6

Purchased

No

Each

516.0000

6

MS21042I 6

**

Nut

DAS
02
9-89

DAS
9
9-89

Location

Loc Qty

Loc Code

ST273A

200

m131624

200

ST304

212

m129499

12

m131317

200

ST305

104

m129909

8

m130799

96

MS21920-26

Purchased

No

Each

42.0000

4

MS21920-26

**

Clamp

Location

Loc Qty

Loc Code

LG050

42

107974

1

109206

41

MS21920-28

Purchased

No

Each

83.0000

2

MS21920-28

**

Clamp

Location

Loc Qty

Loc Code

FG

1

105884

1

LG050

82

M130400

50

M130665

2

M131367

30

131651

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Shop Packet Print

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DQA: _____ Date: _____



WORK ORDER NON-CONFORMANCE / UPDATE

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Work Order: _____ Part No. _____ NCR No. _____	DISPOSITION Rework ☐ Scrap ☐ Use-as-is ☐ Suspected Unapproved ☐	AGAINST DEPARTMENT/PROCESS Skid-tube ☐ Machining ☐ Thermoforming ☐ Large Fab ☐ Crosstube ☐ Small Fab ☐ Finishing ☐ Composite ☐ Water Jet ☐ Prod. Eng. Coord. ☐ Rec/Store/Packaging ☐ Supplier ☐ Engineering ☐ Quality ☐ Other ☐
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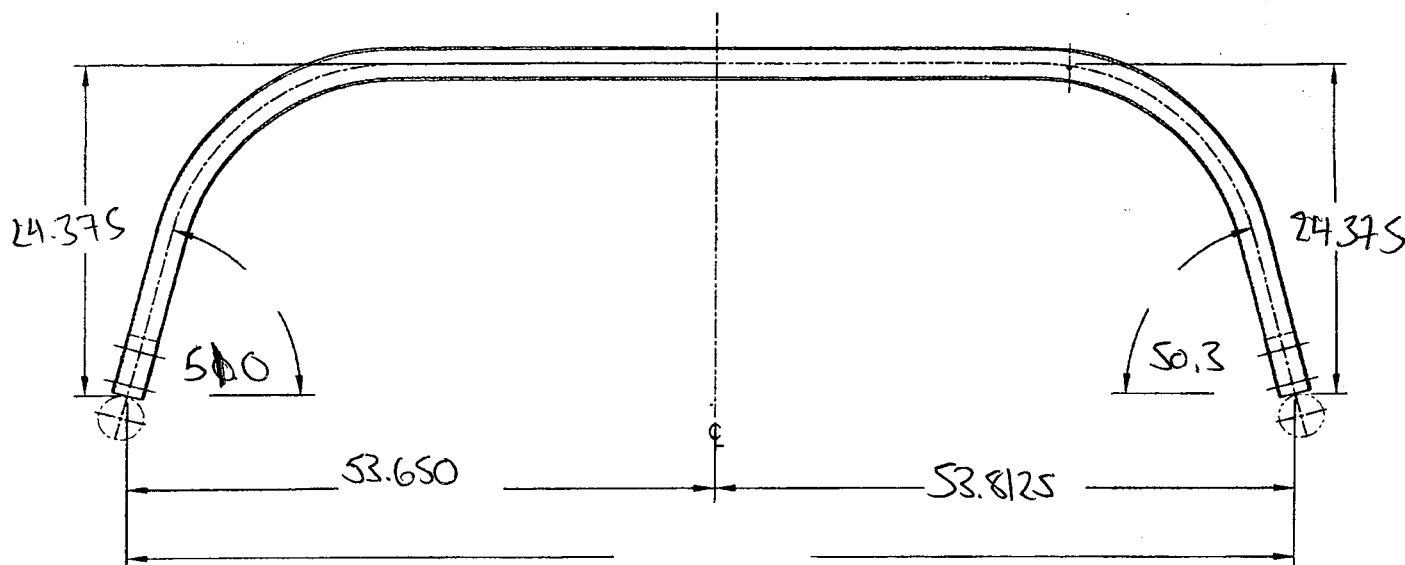
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DART AEROSPACE LTD		Work Order: 130091
Description: Crosstube High Aft (412)		Part Number: D412-664-403
Inspection Dwg: D412-664-443 Rev: A		Page 1 of 1

Required Dimension	Min	Max
Height	24.12	24.62
1/2 Span	53.56	53.82
Angle	49°	52°
Total Span	107.12	107.64
Bending Passes	8	--
Crushing	--	7%



	Side A	Side B
Bending Passes	15	16
Crushing	6.4%	6.1%
Comments		

QC15 Inspection	RB
Date	15-06-04

Rev	Date	Change	Revised by	Approved
A	14.07.08	New Issue	KJ	UP

Item	Qty -443	Part Number	Description
1	X	D412-664-443	CROSSTUBE ASSEMBLY (412 HI AFT)
2	1	D6020-132	CROSSTUBE MATERIAL (132" MIN. LENGTH)
3	2	D3595-063-530	RUBBER CUSHION
4	1	D4909-1	SUPPORT
5	2	D4910-1	CHAFING SHIELD
7	4	MS21920-26	CLAMP
8	2	MS21920-28	CLAMP
9	A/R	SCOTCH-WELD DP460	EPOXY ADHESIVE, 3M SCOTCH-WELD
10	A/R	PROSEAL 890	SEALANT

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6020-132
FINISHED LENGTH = 130.10±0.080 (BEFORE BENDING/TRIMMING)
- 2) FINISH: PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (ZN C6-2, HATCHED AREA)
PAINT OUTSIDE PER DART QSI 005 4.2
AFTER PAINTING, REMOVE MASKING AND APPLY MATTE CLEAR COAT PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART P/N "D412-664-443" AND B/N ON INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 90.2 lb AFTER MACHINING
86.7 lb FINISHED WEIGHT
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

BENDING

- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 7% (BASED ON O.D.) IN LOWER HALF OF R35 BEND AND 6% (BASED ON O.D.) ON REMAINING TUBE.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038. TO BE PERFORMED AFTER FINAL POST-BEND GRINDING. ANY ADDITIONAL GRINDING REQUIRES ANOTHER LPI INSPECTION.

ASSEMBLY

- 12) INSTALL D4909-1 CENTER SUPPORT USING A 0.04" TO 0.07" THICK LAYER OF SCOTCH-WELD DP460 PER QSI 015.
- 13) INSTALL MS21920-28 CLAMPS WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE D4909-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE ON TOP OF CROSSTUBE SUPPORT.
- 14) IF NOT ALREADY PRESENT ON CHAFING SHIELD, APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D4910-1 CHAFING SHIELD AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL PROSEALED D4910-1 CHAFING SHIELD ONTO CROSSTUBE BY APPLYING A THIN COAT OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.
- 15) TORQUE CLAMPS ON D4909-1 SUPPORT 80 TO 100 IN-LB. TORQUE CLAMPS ON D4910-1 CHAFING SHIELD 40 TO 50 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER ADHESIVES HAVE CURED FOR 24 HOURS.

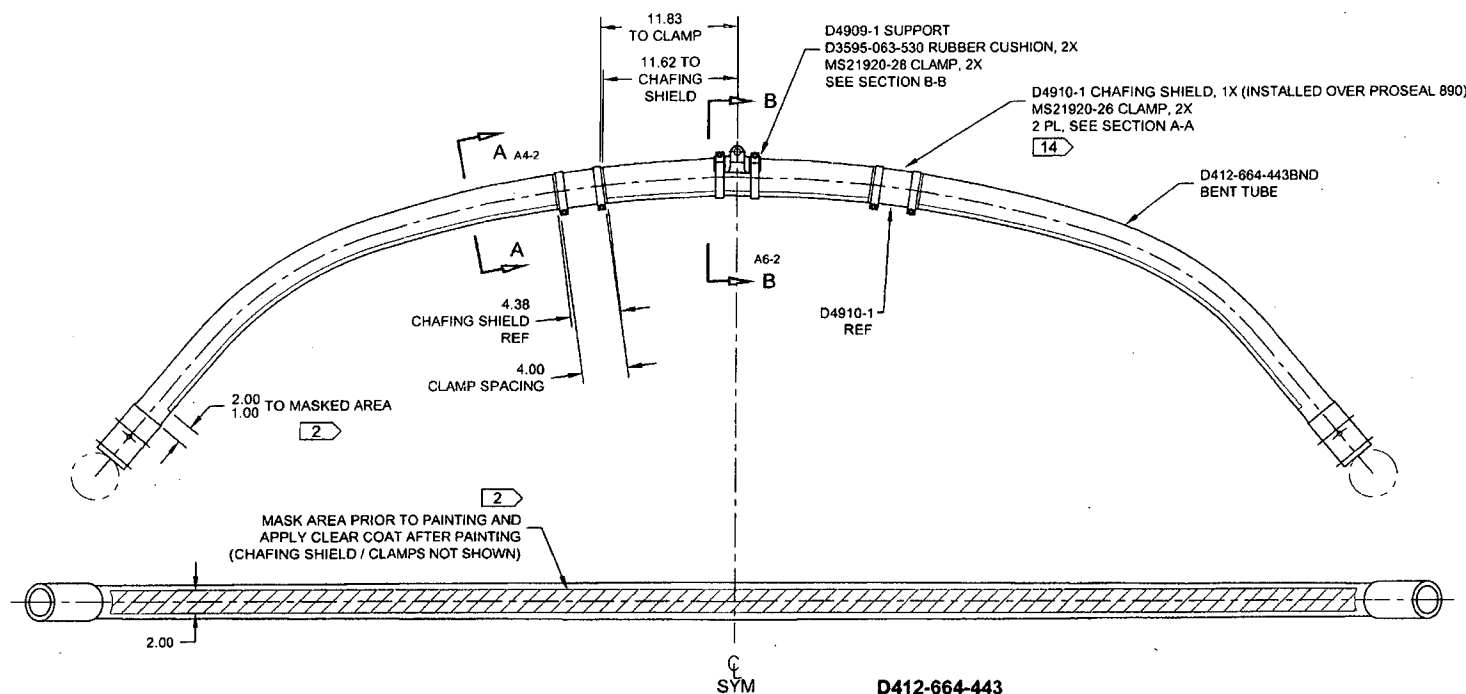
130091 MCT
1502-23

UNDER REVIEW
11/1/00
RELEASED
2014-05-26

A	NEW ISSUE	CP	14.04.01
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	14.04.01		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D412-664-443	REV. A SHEET 1 OF 4
TITLE CROSSTUBE ASSY (412 HI AFT)	SCALE NTS

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D412-664-443
ASSEMBLY DETAIL

UNDER REVIEW
OK 11/15/14 11/17/14

RELEASED
2014-05-26
WMD

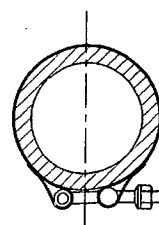
12
APPLY 3M SCOTCH-WELD DP460
BETWEEN D4909-1 SUPPORT AND
THE CROSSTUBE

D4909-1
SUPPORT
REF

D3595-063-530
RUBBER CUSHION
UNDER CLAMP, REF

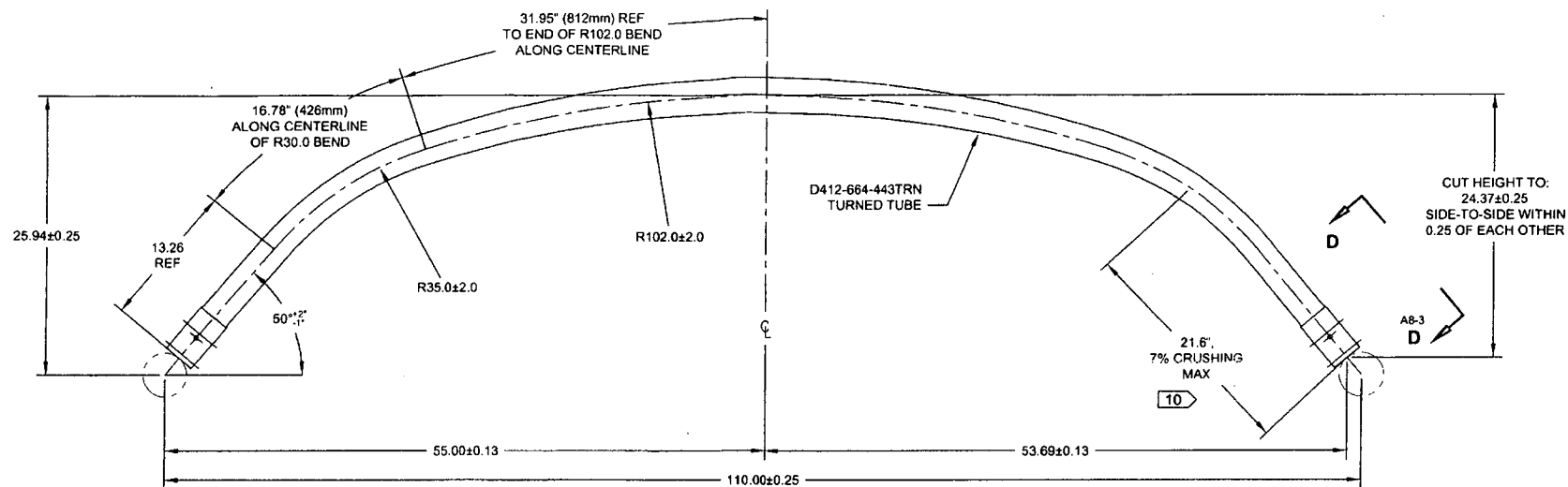
13 15
MS21920-28
CLAMP, REF

SECTION B-B D4-2
SCALE 4X



SECTION A-A C6-2
SCALE 4X

DESIGN	90	DART AEROSPACE LTD	
DRAWN	90	HAWKESBURY, ONTARIO, CANADA	
CHECKED	De	DRAWING NO.	REV. A
MFG. APPR.		D412-664-443	SHEET 2 OF 4
APPROVED	11/17/14	TITLE	SCALE
DE APPR.		CROSSTUBE ASSY (412 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR DISCLOSED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

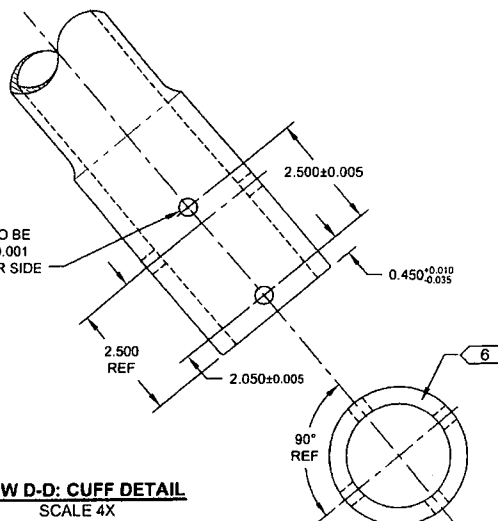


D412-664-443BND
BENDING DETAIL

10

Ø0.386^{+0.005}_{-0.000} HOLE TO BE
ALIGNED WITHIN ±0.001
OF HOLE ON OTHER SIDE
OF CUFF
2 PL

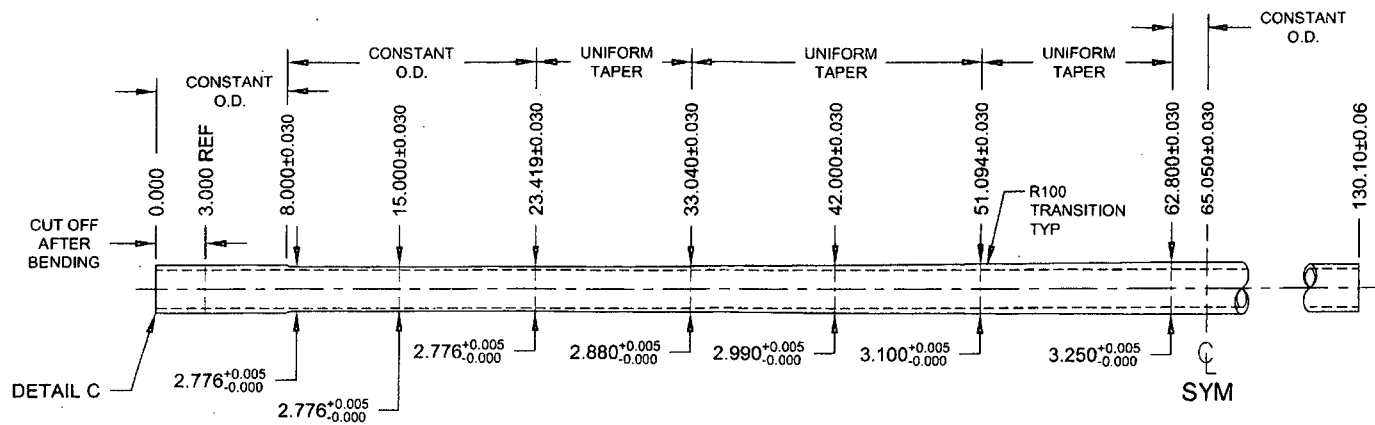
C1-3 **VIEW D-D: CUFF DETAIL**
SCALE 4X



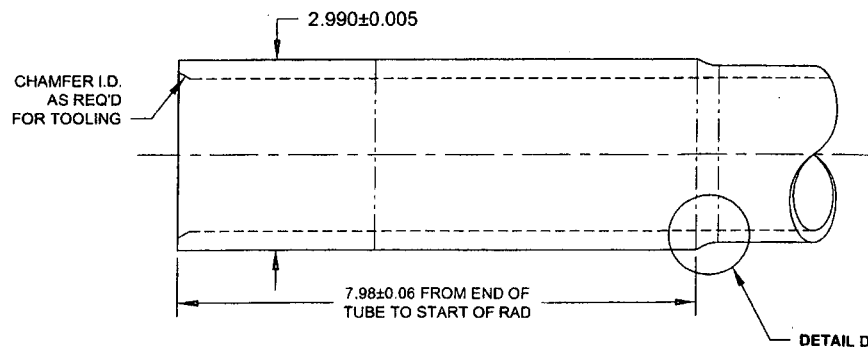
OK
Pm/s/y
UNDER REVIEW
11/7/36

RELEASED
2014-05-26

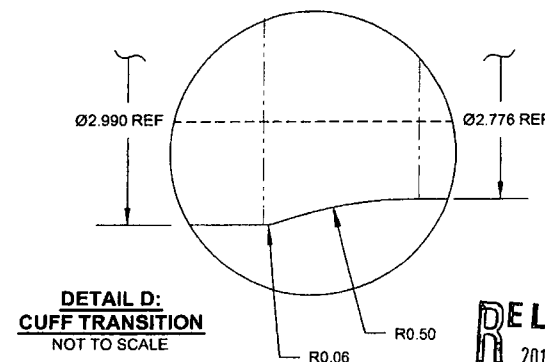
DESIGN		DART AEROSPACE LTD	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D412-664-443	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSY (412 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2013 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR REPRODUCED IN ANY MANNER WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	



D412-664-443TRN
TURNING DETAIL



DETAIL C:
CUFF TRANSITION
SCALE 4X



DETAIL D:
CUFF TRANSITION
NOT TO SCALE

OK 11/14
UNDER REVIEW

RELEASED
2014-05-26

DESIGN	9	DART AEROSPACE LTD	
DRAWN	9	HAWKESBURY, ONTARIO, CANADA	
CHECKED	9	DRAWING NO.	REV. A
MFG. APPR.	9	D412-664-443	SHEET 4 OF 4
APPROVED	9	TITLE	SCALE
DE APPR.	9	CROSSTUBE ASSEMBLY (412 HI AFT)	NTS
DATE	14.04.01	COPYRIGHT © 2013 BY DART AEROSPACE LTD	
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Linda Lacelle

From: David Shepherd
Sent: April-02-15 2:01 PM
To: Linda Lacelle; Chris Provencal
Cc: Nigel Forbes
Subject: Re: AOG***NEW SO120870 HELISERVICIO SA DE CV - HOLLY

Completely agree with Chris on this. I think we need to do everything we can to make sure the tubes are well degrease before we start priming and painting the tubes.

David

From: Linda Lacelle
Sent: Thursday, April 2, 2015 10:54 AM
To: Chris Provencal
Cc: David Shepherd; Nigel Forbes
Subject: RE: AOG***NEW SO120870 HELISERVICIO SA DE CV - HOLLY

OK, thx!

From: Chris Provencal
Sent: April-02-15 1:50 PM
To: Linda Lacelle
Cc: David Shepherd; Nigel Forbes
Subject: RE: AOG***NEW SO120870 HELISERVICIO SA DE CV - HOLLY

We have no idea how the powder coat will perform. It would be much safer to paint them.

Chris

From: Linda Lacelle
Sent: Thursday, April 02, 2015 12:30 PM
To: Chris Provencal
Cc: David Shepherd; Nigel Forbes

Subject: FW: AOG***NEW SO120870 HELISERVICIO SA DE CV - HOLLY

Importance: High

We need to make 2 more for this order – D412-664-403 SS crosstubes, do we spray paint these also, or powdercoat???

Thx

Linda

From: Chantal Chartrand

Sent: April-02-15 12:04 PM

To: Sylvie Larocque; Brigitte Golden

Cc: Linda Lacelle; Mario Poulin; Melanie Fauteux; Sherri Van Eyk; Holly Menard

Subject: AOG***NEW SO120870 HELISERVICIO SA DE CV - HOLLY

PLEASE FIND ATTACHED NEW SO ***AOG***

****Use cost price on all doc and indicate customer's tax ID HEL120919QD0 in AWB*****

Send Form 1/8130-3 in a different shipment to:

HELISERVICIO SA DE CV

PASEO DE LA REFORMA 2654

PISO 19, COL. LOMAS ALTAS

DEL. JOSE MIGUEL HIDALGO,

DF, CP 11950

MEXICO

ATTN: ROSARIO MENESES

AS SOON AS THE ORDER IS READY:

AOG freight service

Christine Provencal

Air Export Agent

SDV Logistiques (Canada) Inc.

3333 Douglas B. Floreani

St-Laurent, Québec, Canada, H4S 1Y6

Tel. 514-338-4444 ext (3343) – Direct: 514-338-4719 - Fax: 514-956-0079

c.provencal@sdv.ca

aogsdvyul@sdv.ca

D412-664-403 Stainless Steel Hardened Crosstube

setup

3.25" rollers

Bend lines are @ 32" 35" from centerline of tube

1.75" shims are used in the buggy for side bends

Middle Bend

Middle bend goes from 35" line with crosstube being on the large table of the machine.

Approach for middle bend is 2870 on both rollers. Run programs middle1-6 check.

Side Bends

Run programs side 1-10 down the taper from 32" tangent line. Approach is 2900 on Y roller and 3385 on W roller. Programs 1-5 go back to the tangent line ready for next bend. Program 6-10 release at the end. Approaches on programs 6-10 are on the first line of programs... Programs 11-15 run down taper for 9" then come back up to finish tube slowly, be careful with these programs...

Enjoy

Notes:

13/12/12 ran 1 tube, program middle 6 was not enough, prog middle 7 overbent slightly. will create middle 6b to be a halfway point. after program 7 we ran the tube as per folio. one side finished nicely at program 10, the opposite side finished nicely after running program 1 2 times, then 13 to finish. this left the tube closer to max tolerance on the span, 53.730/53.800.

1	Manito	1
2	6	2
3	6b	3
4	7	4
5		5
6		6
7	(16)	7
8		8
9		9
10		10
11		11
12		12
13		13
15		15
16		

DART
AEROSPACE

Dart Aerospace Ltd.
1270 Aberdeen Street
Hawkesbury, ON K6A 1K7
Tel: 613 632 9577
Fax: 613 632 1053

PURCHASE ORDER

Purchase Order ID **PO28743**

Purchase Order Date 6/9/2015
PO Print Date 6/10/2015

Page Number 2 of 2

Order From :
SKYSERVICE
6120 MIDFIELD ROAD
MISSISSAUGA, ONTARIO L5P 1B1
CANADA

VC-SKY001

Ship To : DART AEROSPACE LTD
1270 ABERDEEN
HAWKESBURY, ON K6A 1K7
CANADA

Contact Name
Vendor Phone 905-678-5636

Ship To Contact

Ship To Phone

Ship Via: Delivered

Ship Acct:

130091

D412-664-203
CROSSTUBE

6/10/2015

Yes

6/10/2015

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

Buyer Chantal Lavoie
Customer POID
Customer Tax # 10127-2607
Terms Net 30
Currency CAD
FOB FCA - (Free Carrier)

1.00

\$270.00

\$270.00

SPK-06-10

Line Total: \$270.00

4 130092

D412-664-403
CROSSTUBE

6/10/2015

Yes

6/10/2015

LIQUID PENETRANT INSPECTION AS PER QSI 038 OR
LPI AS PER ASTM 1417 LEVEL 2

1.00

\$270.00

\$270.00

Line Total: \$270.00

PO Total: \$810.00

CZ

Note: Terms & Condition of Purchasing(Suppliers) and Procurement Quality Clauses are an integral part of our AS9100 requirements. To learn in detail, please visit www.dartaerospace.com for further explanation.

Change Nbr: 2

Change Date: 6/10/2015



skyservice Work Order Traveler

Sky Service F.B.O. Inc.

DOT APP 53-89 / EASA 145.7142 / BDA AMO 385

WO #: MWO24856	Customer: Dart Aerospace Ltd.	Dept: NDT YUL	Reference: PO28743
Descr:	PN:	S/N:	Qty: 1
Make:	Model:	Reg:	A/C S/N:
TSN:	CSN:	TSO:	
Task: UNSCHEDULED			Sequence: 1

Work Required:

CARRY OUT NDT ON THREE CROSSTUBES AS PER PO : PO28743

ITEM ID: D412-664-403 STAINLESS STEEL AFT CROSSTUBES (HIGH)

- 1 - WORK ORDER ID#: 130091
- 2 - WORK ORDER ID#: 130090
- 3 - WORK ORDER ID#: 130092

SP15-06-10

Action Taken:						Date:	Initial/Stamp:
LIQUID PENETRANT INSPECTION CARRIED OUT ON ITEMS LISTED ABOVE (ITEMS 1-3) AS PER ASTM1417M-13						9 Jun 2015	 [Signature]
NO CRACK FOUND							
PEN : ZL-27A MWO5678 DEV : SKD-S2 MPO11715 CLEANER : SKC-S MPO13923							
Description	Location	P/N	Qty	Batch	S/N Off	S/N On	

I certified that the maintenance described above has been performed in accordance with the applicable standard of airworthiness.

Signature: [Signature]	ACA/SCA Stamp: 186 83-89	Date: 9 Jun 2015
Name: CHRISTIAN BRIEN		

5.2 HIGH GEAR CROSSTUBE, HEAVY-DUTY

ITEM	QTY -403	PART NUMBER	DESCRIPTION
	X	D412-664-403	CROSSTUBE INSTALLATION, HEAVY-DUTY, 412 HIGH AFT
9	1	D412-664-443	CROSSTUBE ASSEMBLY, HEAVY-DUTY, 412 HIGH AFT
70	1	* D4909-1	SUPPORT
71	2	* D4910-1	CHAFING SHIELD
72	2	* D3595-063-530	RUBBER CUSHION
73	4	* MS21920-26	CLAMP
74	2	* MS21920-28	CLAMP
75	4	AN6-40A	BOLT
76	2	AN6-41A	BOLT
77	6	MS21042L6	NUT (OR MS21042-6)
78	18	AN960JD616	WASHER

*REFERENCE ONLY. PARTS ARE INCLUDED IN D412-664-443 ASSEMBLY ABOVE

NOTE: KITS INCLUDE EXTRA HARDWARE FOR COMPATIBILITY WITH BOTH DART AND BELL/AAI SKIDTUBES.